

PERCHLORATE ASSESSMENT  
UNITED TECHNOLOGIES CORPORATION CHEMICAL SYSTEMS DIVISION

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**Facility:** United Technologies Corporation (UTC)  
Chemical Systems Division  
600 Metcalf Road  
San Jose, Santa Clara County

**Handler ID:** CAD001705235

**Summary:** Ammonium perchlorate has been used in rocket motor production and testing at the UTC facility. There has been documented releases of perchlorate to both soil and groundwater (Attachments 1 and 2). Perchlorate has been detected at part per million concentrations in the shallow alluvial groundwater zone and in the deeper Santa Clara Formation (bedrock). According to Steven Hill, Section Leader, Toxic Cleanup Division, San Francisco Bay Regional Water Quality Control Board (SFRWQCB), perchlorate has been detected in groundwater at a maximum concentration of 180 mg/l. Shallow groundwater and several seasonal creeks at UTC flow towards Anderson Reservoir which is a source of drinking water. Mr. Hill indicated that starting in about 1995, UTC began quarterly groundwater monitoring for perchlorate at selected wells but has not tested the creeks or Anderson Reservoir.

Cecil Felix of the SFRWQCB has recently been assigned as the project manager for the UTC site. In a telephone conversation on September 11, 1997, Mr. Felix indicated that he will be contacting UTC and requesting that they sample the creeks and Anderson Reservoir for perchlorate during the next quarterly groundwater monitoring event in October 1997. He said he would also discuss with UTC the possibility of obtaining lower detection limits for the perchlorate analysis (18 µg/l).

**Recommendation:** Continue to coordinate with the SFRWQCB and support their efforts to require testing for perchlorate in the creeks and Anderson Reservoir.

**Background:** UTC develops, manufactures, and tests solid rocket fuels and rocket motors at this 5,200 acre facility (Figure 1). The two main valleys within the developed portion of the site are Shingle Valley and Mixer Valley. There is significant groundwater contamination with several major volatile organic compound plumes, one diesel plume and two PCB plumes. Potential sources of contamination are former locations of drum storage areas, surface impoundments, landfills, open burning areas, sumps and tanks. Remediation and cleanup efforts are ongoing at the

facility. The shallow groundwater table ranges between 4 and 11 feet below ground surface. Both valleys have deeper groundwater levels located in the Santa Clara Formation (bedrock) at 50 to 70 feet below ground surface.

### **Regulatory Status**

RCRA 3008(h) Administrative Order on Consent, U.S.EPA Docket No. RCRA-09-89-0018, February 22, 1991

Multiple Orders for Site Cleanup Requirements, California Regional Water Quality Control Board, San Francisco Bay Region (does not address perchlorate)

Hazardous Waste Storage and Treatment Permit, Renewed June 1997, California EPA, Department of Toxic Substances Control

Closure Plan for Open Burning Units under review by California EPA, Department of Toxic Substances Control

### **Perchlorate Releases**

The soil and groundwater information given below is based on a preliminary screening of the following three reports:

RCRA Facility Investigation (Non CBI), United Technologies Corporation, Chemical Systems Division, June 1991

RCRA Facility Investigation/Corrective Measures Study Addendum, United Technologies Corporation, Chemical Systems Division, June 1993

Second Quarter 1997 Environmental Monitoring Report, United Technologies Corporation, Chemical Systems Division, April-June 1997

### **1. Soil**

#### Station 0501, Oxidizer Grinding Station

The oxidizer grinding station is located in Mixer Valley on Oxidizer Road. The station was constructed in 1962 and consists of one building and a large grated concrete-lined sump to contain washwater from station decontamination. The station was used to grind ammonium perchlorate to specific sizes required for rocket motor production.

Soil sampling in the area found that perchlorate in soils ranged from 14,000  $\mu\text{g/kg}$  to 6,200,000  $\mu\text{g/kg}$  (Attachment 1).

#### Station 0521, Oxidizer Preparation Building

The oxidizer preparation building is located in Mixer Valley on Oxidizer Road. The station was constructed in 1960 and consists of one building and a drum storage area set into the side of a hill. It was used solely for the preparation of perchlorate.

Soil sampling in the area found that perchlorate concentrations in soil ranged from 7,800  $\mu\text{g/kg}$  to 370,000  $\mu\text{g/kg}$  (Attachment 1).

#### Station 0532, Oxidizer Cart Conditioning Station

The oxidizer cart conditioning station is a single building located at the northern end of Mixer Road. Ammonium perchlorate is the only chemical known to have been used or stored at the site.

Soil sampling in the area found that perchlorate concentrations in soil ranged from 3,800  $\mu\text{g/kg}$  to 17,000  $\mu\text{g/kg}$  (Attachment 1).

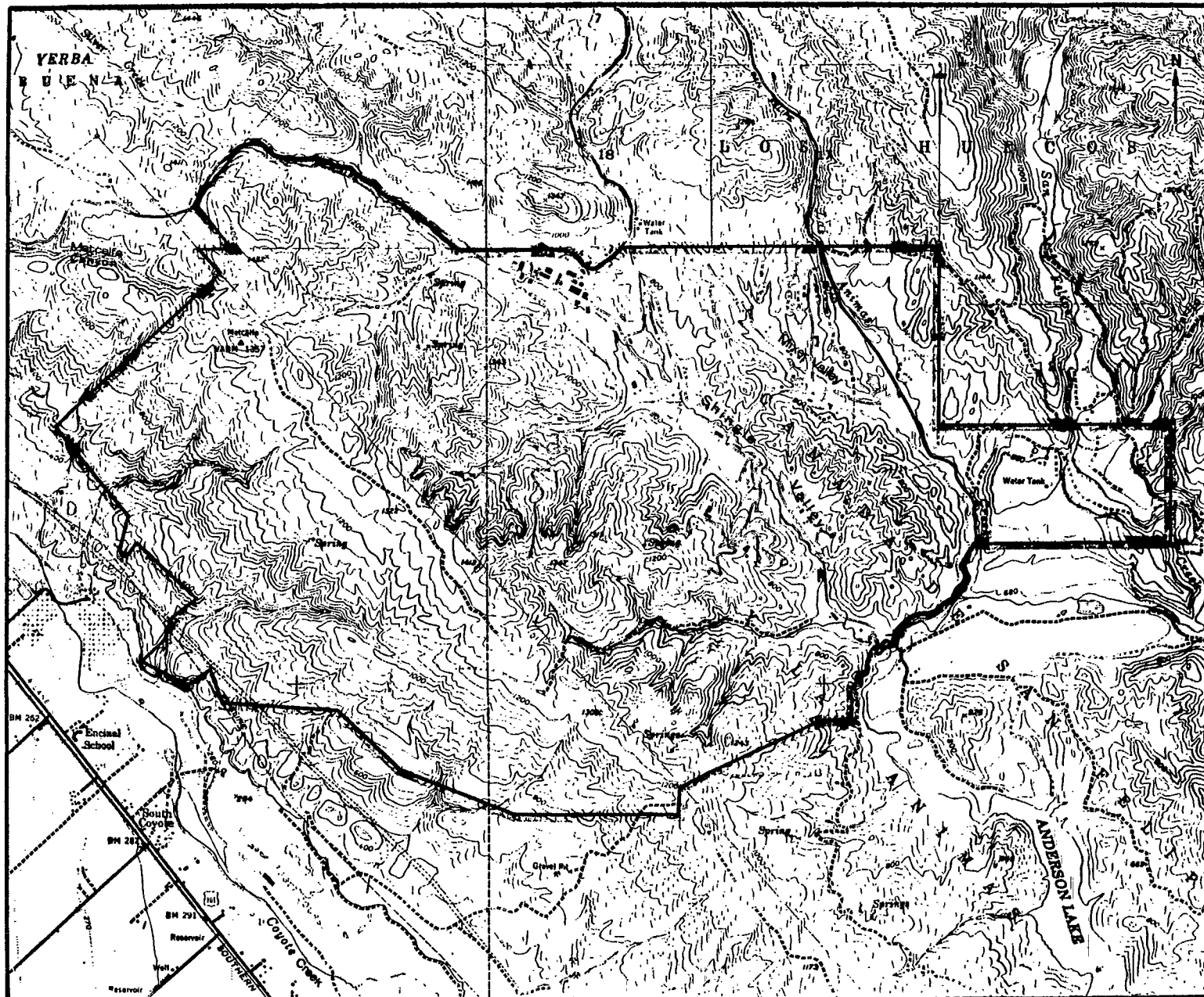
#### Station 0891, Open Burning Facility

The Open Burning Facility is located in the eastern-most portion of the facility designated as the "Panhandle" on site maps. It consists of ten Open Burning Units (OBU's) where waste solid rocket propellant was "thermally treated". According to Andy Berna-Hicks, Permit Writer, California EPA, Department of Toxic Substances Control (DTSC), burning at the OBU's stopped on January 1, 1997. DTSC is currently reviewing a closure plan for the OBU's. Each OBU is made entirely of earthen materials, and all wastes were treated on the ground surface. Each OBU consists of a rectangular area approximately 20 feet wide by 30 feet long, surrounded on three sides by earthen berms ranging in height from 3 to 10 feet and having an average width of 20 feet. Class 1.3 propellants, which consist of approximately 70 percent ammonium perchlorate, were burned in the OBU's (Attachment 1).

## **2. Groundwater**

In 1992/1993, perchlorate was detected in groundwater samples taken in the vicinity of Stations 0501 and 0521 (Attachment 2). Perchlorate concentrations in groundwater ranged from Non Detect (ND) to 58 mg/l. Non detect was indicated for some wells but the detection limit is not specified. Considering that the sampling was done in 1992/1993, the detection limit is probably around 0.1 mg/l or 100  $\mu\text{g/l}$ . A detection limit of 100  $\mu\text{g/l}$  would not be useful for determining if the tentative groundwater standard of 18  $\mu\text{g/l}$  has been exceeded. The Second Quarter 1997 Monitoring Report confirms the presence of perchlorate in Mixer Valley near Stations 0501 and 0521. Concentrations range from less than 0.1 mg/l to 32 mg/l.

According to the Second Quarter 1997 Report, perchlorate was also detected in groundwater samples taken in the Panhandle area at the Open Burning Facility (Station 0891). Perchlorate was detected at concentrations ranging from less than 0.1 mg/l to 48 mg/l. Wells in the Panhandle area are all screened in the deeper groundwater zones located in the Santa Clara Formation (bedrock) at 50 to 70 feet below ground surface.



EXPLANATION  
UTC  
CSD PROPERTY  
BOUNDARY

1000 0 1000 2000 3000  
SCALE IN FEET

CONTOUR INTERVAL 40 FEET

FROM USGS MORGAN HILL,  
CALIFORNIA QUADRANGLE,  
PHOTO REVISED, 1980

NOTE: LAS ANIMAS ROAD  
INCORRECTLY IDENTIFIED  
AS SAN FELIPE ROAD IN  
RFA REPORT AND USGS  
MORGAN HILL  
QUADRANGLE MAP.

Figure 1

⇒ ICF Technology

FIGURE 1  
TOPOGRAPHY AND  
SURFACE DRAINAGE

**ATTACHMENT 1**

**SOIL DATA**

## 9.10 STATION 0521, OXIDIZER PREPARATION BUILDING

### Background and Operational History

Station 0521 is located in Mixer Valley on Oxidizer Road. Station 0521, Oxidizer Preparation Building, was constructed in 1960 and consists of one building and a drum storage area set into the side of the hill. It is used solely for the preparation of ammonium perchlorate.

The 1985 Weiss Associates report that measured soil gas VOC concentrations did not sample near Station 0521. There are no known previous soil investigations at this station.

Two groundwater iso-concentration maps prepared by ICF in August 1989, displaying TCA and TCE concentrations in the saturated alluvium of the CSD site, showed large chemical plumes bordering this station. The TCA map displayed a plume approximately 50 feet south of the station with a maximum contour concentration of 1,000  $\mu\text{g/l}$ . The TCE map showed a plume approximately 50 feet south of the station, with a maximum contour concentration of 1,000  $\mu\text{g/l}$ . Depth to groundwater is five to fifteen feet. A second pair of groundwater iso-concentration maps also prepared by ICF in August 1989, display TCE and TCA concentrations in the Upper Santa Clara Formation. Both maps show a chemical plume approximately 300 feet south of the station, with a maximum contour concentration on the TCA map of 100  $\mu\text{g/l}$  and a maximum contour concentration on the TCE map of 1,000  $\mu\text{g/l}$ .

### Chemical Usage

Chemicals known to have been used or stored include ammonium perchlorate for Station 0521. Chemical usage was determined based on information from CSD.

### Investigations at Station 0521

Soil and soil gas samples were collected at shallow intervals of locations where releases from Station 0521 would be expected to migrate and from deeper intervals to further establish the potential for Station 0521 to be a source of identified groundwater contamination.

The sampling program at Station 0521 consisted of collecting six soil gas samples, six surface soil samples, and three subsurface soil samples. Figure D-87 presents the sampling locations at Station 0521. Soil gas samples were analyzed for aromatic and halocarbon VOCs. The surface soil and subsurface soil boring samples were analyzed for VOCs by EPA Method 8240, and for perchlorate.

Soil Gas: Soil gas samples were collected on September 8, 1989. The location and depth of each soil gas sample are presented below:

- |       |   |
|-------|---|
| SG-01 | Located on the south side of the building to investigate possible releases from the sump. Sampling depth was 4 feet.  |
| SG-02 | Same location as SG-01, but at greater depth to investigate the potential presence of a groundwater plume beneath the station. Sampling depth was 9 feet.   |
| SG-03 | Located on the east side of the building to investigate a potential plume migrating from the sump. Sampling depth was 5 to 6 feet.  |
| SG-04 | Located west of the building near the drum storage area. Sampling depth was 5 feet.   |
| SG-05 | Located on the west side of Oxidizer Road, across the street from Station 0521. Taken near the center of the valley to investigate the potential presence of any upgradient sources. Sampling depth was 6 feet. |

SG-06 Located on the west side of Oxidizer Road and north of Station 0521. Taken near the center of the valley to investigate the potential presence of any upgradient sources. Sampling depth was 6 feet.

Surface Soil: Surface soil samples were taken on September 7, 1989. In addition to VOC analysis, soil samples were also analyzed for perchlorate. The location, depth, and description of each surface soil sample are presented below:

SS-01 Located in a low-lying area south of Station 0521, between Stations 0521 and 0501 where run-off from the stations would accumulate. Sampling depth was 6 to 12 inches. Materials encountered were moist, medium sandy silt.

SS-02 Located in a surface water run-off channel east of the station, below a white discharge. Sampling depth was 8 to 10 inches. Materials encountered were damp, dark brown sandy silt.

SS-03 Located in a drainage ditch which controls surface water run-off from the northeast side of the station. Sampling depth was 6 to 12 inches. Materials encountered were damp, medium brown sandy soil.

SS-04 Located in a drainage ditch that drains both Stations 0521 and 0501 and the drum storage area at Station 0521. Sampling depth was 8 to 10 inches. Materials encountered were damp, medium brown sandy silt.

SS-05 Collect from discolored soils observed near a pipe discharge on the south side of the building. Sampling depth was 8 inches. Materials encountered were damp medium brown sandy silt.

SS-06 Duplicate of SS-05. Sampling depth was 8 inches.

Soil Borings: Three soil boring samples were collected at Station 0521 on October 9, 1989. The location, depth, and description of each sample is presented below:

SB-01, These sample designations were not used.  
SB-02  
and SB-03

SB-04-05 Located west of the building, 10 feet south of the location of SG-03, near the lower entrance to the station. The sample was collected at a depth of 5 feet. Dry reddish-brown fine silty sand with some gravel was encountered.

SB-05-05 Located on the west side of Oxidizer Road, across the street from Station 0521 and 10 feet away from the location of SG-05. The sample was collected at a depth of 5 feet. Dry reddish-brown stiff silty clay with some gravel was encountered.

SB-06-05 Located on the west side of Oxidizer Road, across the street from Station 0521 and 12 inches away from the location of SB-05. This sample was collected for the purpose of obtaining a duplicate sample of SB-05. The sample was collected at a depth of 5 feet. Dry reddish-brown stiff silty clay with some gravel was encountered.

### Analytical Results

Table D-113 summarizes the analytical results for samples collected at Station 0521.



## Summary

Based on historical use of the station, results obtained from the current investigation and review of existing information, Station 0521 does not appear to be a source of VOCs in groundwater. The levels of VOCs detected in soil samples from Station 0521 are below the threshold value. No further investigation at this station is recommended.

Table D-113  
SUMMARY OF SAMPLING EVENTS AT STATION 0521  
Sampling conducted by ICF Technology Incorporated, September and October 1989

Sample ID	Date Collected	Depth (Feet)	Chemical Concentration *					
			Total VOCs (1)	EB	TCE	Benzene	Toluene	Perchlorate
SG-01	09/08/89	9.0	110	110	ND	ND	ND	NA
SG-02	09/08/89	9.0	1,300	ND	1,300	ND	ND	NA
SG-03	09/08/89	5.0	ND	ND	ND	ND	ND	NA
SG-04	09/08/89	5.0	56	ND	ND	56	ND	NA
SG-05	09/08/89	6.0	ND	ND	ND	ND	ND	NA
SG-06	09/08/89	6.0	510	ND	ND	190	320	NA
SS-01	09/07/89	1.0	47	ND	40	ND	7	21,700
SS-02	09/07/89	0.8	18	ND	18	ND	ND	370,000
SS-03	09/07/89	1.0	5	ND	5	ND	ND	22,400
SS-04	09/07/89	0.8	63	ND	53	ND	10	168,000
SS-05	09/07/89	0.7	10	ND	10	ND	ND	23,000
SS-06	09/07/89	0.7	14	ND	14	ND	ND	25,000
SB-04-05	10/09/89	5.0	10	ND	ND	ND	10	ND
SB-04-05	10/09/89	5.0	42	ND	ND	ND	42	7,800
SB-06-05	10/09/89	5.0	55	ND	ND	ND	55	NA

\* Soil gas concentrations in ppbv; soil sample concentrations in  $\mu\text{g/kg}$ .

(1) Analysis using EPA Method 8240. Those compounds not listed were not detected above laboratory reporting limit.

TCE = Trichloroethene

EB = Ethylbenzene

ND = Not detected above the laboratory reporting limit

## 9.13 STATION 0532, OXIDIZER CART CONDITIONING STATION

### Background and Operational History

Station 0532 is located at the northern end of Mixer Road. Identified as the Oxidizer Cart Conditioning Station, this station consists of one relatively small building situated immediately next to the road. There have been documented releases of ammonium perchlorate at this station.

Soil gas analysis performed in June and July, 1985 by Weiss Associates did not include this area. There are no known previous soil investigations at this station.

Analysis of groundwater performed by ICF in August 1989 estimated that Station 0532 was at the northeast edge of a large chemical plume with maximum contour concentrations of 1,000  $\mu\text{g/l}$  TCE in the Upper Santa Clara Formation and in the saturated alluvium. Depth to groundwater is five to fifteen feet. The station is also at the northeast edge of a TCA plume with maximum contour concentrations of 1,000  $\mu\text{g/l}$  in the saturated alluvium and 100  $\mu\text{g/l}$  in the Upper Santa Clara Formation.

### Chemical Usage

Ammonium perchlorate is the only chemical known to have been used or stored at Station 0532. Chemical usage was determined based on information from CSD.

### Investigations at Station 0532

Based upon the facility history, this station had a low probability of being a source of VOCs in groundwater; however, CSD implemented a field sampling program to be conservative. Surface soil samples were collected in locations where releases from Station 0532 would be expected to migrate.

The sampling program at Station 0532 consisted of collecting three surface soil samples on September 8, 1989. Figure D-82 and D-83 present the sampling locations at Station 0532.

Surface Soil: Samples were analyzed for VOCs using EPA Method 8240, and perchlorate. The location and depth of each surface soil sample are presented below:

- |       |  |
|-------|--|
| SS-01 | Located on the west side of the building adjacent to the cart entrance. Sampling depth was 6 to 12 inches. The material consisted of a dark brown, very stiff clayey silt, with minor gravel.  |
| SS-02 | Located near the entrance ramp on the north side of the station where a spill or wash water may discharge. Sampling depth was 8 to 10 inches and the sample material consisted of a slightly moist, reddish brown, clayey silt.        |
| SS-03 | Located along the edge of the entrance ramp on the south side of the station where a spill or wash water may discharge. Sampling depth was 8 to 10 inches. This material also consisted of slightly moist, reddish brown, clayey silt. |

### Analytical Results

Table D-117 summarizes the analytical results for samples collected at Station 0532.

Table D-117  
**SUMMARY OF SAMPLING EVENTS AT STATION 0532**  
 Sampling conducted by ICF Technology Incorporated, September 1989

Sample ID	Date Collected	Depth (Feet)	Chemical Concentration *		
			Total VOCs (1)	TCE	Perchlorate
SS-01	09/08/89	1.0	13	13	3,800
SS-02	09/08/89	0.8	ND	ND	17,000
SS-03	09/08/89	0.8	6	6	4,500

\* Soil sample concentrations in  $\mu\text{g/kg}$ .

- (1) Analysis using EPA Method 8240. Those compounds not listed were not detected above laboratory reporting limit.

TCE = Trichloroethene

ND = Not detected above the laboratory reporting limit

### Summary

Based on the results obtained in the current investigation and review of existing information Station 0532 does not appear to be a source of VOCs in groundwater. The levels of VOCs detected in soil samples from Station 0532 are below the threshold value. No further investigation at this station is recommended.

#### **5.2.6.14 Station 0891, Open Burning Facility**

##### **5.2.6.14.1 General Characteristics of Station 0891**

###### **Location of Station and Type of Units**

Station 0891, the Open Burning Facility, is situated on a slightly elongated sloping hill top in the eastern-most portion of the CSD site (the Panhandle – see Figure 1-2). The hill top trends roughly north and drops off relatively quickly on three sides. The small hill has a maximum elevation of approximately 846 feet mean sea level (msl) at the south end of the station and slopes north, at a gradient not exceeding ten to one, horizontal to vertical, to about 790 feet msl near the north end of the station [Brown and Caldwell, 1990a].

Station 0891 consists primarily of ten Open Burning Units (OBUs), where waste propellant is thermally treated (Figure 3-3D). Eight of these OBUs are active and two are inactive. In addition to the ten OBUs, two control bunkers are located at the Open Burning Facility. The current control bunker or personnel bunker, Station 0890, is a reinforced concrete structure that houses the controls and communications equipment for the Open Burning Facility. This building is only used for shelter during treatment operations and is not otherwise regularly inhabited. Since the construction of this new bunker in 1985, the former bunker has been used to house a storage magazine for the electrically-actuated igniter squibs used to initiate the waste propellants during treatment operations. The only other structure at the Open Burning Facility is an abandoned 25-foot-diameter concrete tank that has been used to store irrigation water.

The Station 0891 Open Burning Facility was identified by EPA during the 1986 RCRA Facility Assessment as a RCRA-regulated TSD facility. In the 1986 RFA, EPA designated the OBF as SWMU Unit 4.9.

###### **Design Features**

The Open Burning Facility is surrounded by an eight-foot chain-link fence topped with three-strand barbed wire and posted with warning signs. Gates to the area are kept locked except when the facilities are occupied. Soil embankments surrounding each OBU contain the waste materials and minimize horizontal movement of the material during deflagration or detonation. The OBUs are surrounded by buffer zones of at least 50 feet between any unit and its closest neighboring open burning unit.

Open Burning Facility design features and operating procedures mitigate potential impacts from the thermal treatment process. The waste material is placed in bags or fiber drums inside the OBUs. These containers are impervious to precipitation and minimize contact of wastes with the surface soils. The drainage of each OBU is designed to minimize the infiltration of precipitation. Berms around the units prevent accumulation of precipitation into the OBUs. The bases of the OBUs are sloped, which minimizes ponding and infiltration. These measures lessen the potential for subsurface contamination for the OBUs constructed on the ground surface. Because surface flow is routed around each OBU, the only surface water that could come in contact with the wastes or the residues is that which falls as precipitation within each unit. Since the units average 30 feet by 20 feet, the total possible area of exposure is approximately 0.14 acre.

### **Operating Practices**

The Open Burning Facility is used to treat solid rocket propellant waste materials generated onsite by CSD. Each OBU is made entirely of earthen materials, and all wastes are treated on the ground surface. Each of the OBUs consists of a rectangular area approximately 20 feet wide by 30 feet long, surrounded on three sides by earthen berms ranging in height from 3 to 10 feet and having an average width of 20 feet.

Waste propellant materials are placed inside the treatment unit immediately after the waste is generated. The wastes are accumulated in the OBUs for up to eight weeks. Immediately before a burn event, the OBU is armed with electric igniters that are initiated remotely by operators from a control bunker located at the northwest corner of the Open Burning Facility. The waste propellant materials are treated by deflagration (burning). CSD operating procedures require removal of residues from each OBU within 90 days of each burn.

The length of time between treatment operations varies up to about eight weeks. On the average, waste propellant materials are burned once a month [Brown and Caldwell, 1990a]. OBUs 1 through 6 can contain a maximum of approximately 6,000 pounds of Class 1.3 material. OBUs 11 and 12 can contain a maximum of approximately 3,000 pounds of Class 1.1 material. (Class 1.3 and 1.1 materials are defined below.) The amount of explosive waste thermally treated during a single burn event varies from approximately 1,000 to 36,000 pounds.

Several types of equipment are used to manage the waste propellant materials. The primary equipment used during waste handling, treatment, and ultimate offsite disposal of residues are trucks, bulldozers, and containers. Wastes are delivered to the Open Burning Facility by 3/4-ton pickup trucks

may be ingredients of the waste propellants treated at the Open Burning Facility [Brown and Caldwell, 1988a].

**Aliphatic Nitrate Esters.** This class of explosives includes nitroglycerin (NG), nitrocellulose, and trimethylolethane trinitrate (TMETN). These chemicals are secondary high explosives commonly used in propellants and some industrial explosives. They are classified by the International Maritime Organization (IMO) as Class 1.1 and by the U. S. Department of Transportation (DOT) as Class A. Nitrocellulose is a solid at room temperature. Nitroglycerin and TMETN are liquids at room temperature, used mainly as plasticizers for double-base high energy Class 1.1 propellants.

**Nitramines.** The two most commonly used nitramines at CSD are cyclotetramethylene tetranitramine (HMX) and cyclotrimethylene trinitramine (RDX). Both are white, stable, crystalline solids at room temperature with known hepatotoxic effects. They are classified as high explosives (IMO Class 1.1 and DOT Class A) and are used in the manufacture of high energy (Class 1.1) propellants.

**Ammonium Perchlorate.** Ammonium perchlorate (AP) is an inorganic white crystalline solid oxidizer used extensively at CSD in the manufacture of Class 1.1 and Class 1.3 propellants. When finely ground to less than 15-micron particle size, it is considered a high explosive (Class 1.1) material. In its original shipping container (prior to grinding at CSD), it is considered a Class 1.4 material. The presence of hydrocarbons or metal salts in ammonium perchlorate will greatly increase its sensitivity to detonation.

The majority of the propellants manufactured at CSD are considered to be IMO Class 1.3 low explosives. These propellants typically contain powdered aluminum as the fuel, ammonium perchlorate oxidizer, and polymer binders such as polybutadiene-acrylic acid-acrylonitrile terpolymer (PBAN). The chemical makeup of the different formulations within a propellant type will not vary significantly. The variations between different propellant formulations is usually a matter of physical parameters, such as particle grind size, or small variations in constituent quantities. Although most of the propellants now being manufactured are PBAN composites, other types of low-explosive propellants have been made in the past and could be manufactured by CSD in the future.

Propellant wastes handled at the Open Burning Facility consist primarily of uncured propellant heels from mixing operations and chips of cured propellant generated during the machining operations. Other propellant wastes are generated during quality control sampling, qualification batches, and by the Research and Advanced Technology (R&AT) group as a result of laboratory research on experimental propellant formulations [Brown and Caldwell, 1988a]. The consistency of waste propellant materials includes granular powders, machining chips, viscous semisolid materials, and large solid pieces.

Propellant waste is normally packaged in special electrically conductive polyethylene ("Velostat") bags to minimize the hazards of unplanned ignition of the wastes by static electrical discharges. Each bag contains no more than 40 pounds of material. The various wastes sent to the Open Burning Facility are [Brown and Caldwell, 1990a].

- Class 1.3 propellant
- Class 1.1 propellant
- Non-propellant explosives
- Explosive-contaminated wastes

**Class 1.3 Propellant.** This group of material consists of DOD Class 1.3 propellants that are not mixed or contaminated with other materials and can be divided into two categories: uncured (i.e., liquid) and cured (i.e., semi-solid) material. The uncured propellant is generated from casting and mixing operations, while the cured propellant is generated from trimming the motor to the exact grain configuration required.

Typically Class 1.3 propellants are composed of three ingredients. The largest, about 70 percent by weight, is the oxidizer ammonium perchlorate. Aluminum, the fuel, comprises about 15 percent by weight, and the remainder is the polymeric binder (usually a rubber). Burn rate modifiers are a minor ingredient, usually less than one weight percent.

**Class 1.1 Propellant.** This group of material consists of DOD Class 1.1 propellants that have not been mixed or contaminated with other materials. The material is principally derived from one production program although small quantities are generated by the Research and Advanced Technology group. Class 1.1 propellant ingredients include ammonium perchlorate, aluminum, nitroglycerin, nitrocellulose, and HMX in a rubber binder matrix.

**Non-propellant Explosives.** This category of material includes all propellant ingredients that are explosive, as described above. In addition to the production-related explosive materials, CSD's Research and Advanced Technology group generates small quantities of non-propellant explosives. The substances derived from the Research and Advanced Technology group vary but can include RDX and TMETN in addition to the propellant ingredients.

**Explosive-Contaminated Wastes.** Waste in this category includes materials contaminated with propellants or explosives that derive primarily from empty containers or cleanup activities. Generally, any item that has been in contact with propellants or raw materials is considered potentially explosive and is sent to the Open Burning Facility for treatment. The main sources of miscellaneous wastes are empty raw materials containers and liners, housekeeping items such as conductive plastic sheets used for covering

## **9.8 STATION 0501, OXIDIZER GRINDING STATION**

### **Background and Operational History**

Station 0501 is located in Mixer Valley on Oxidizer Road. Station 0501, an Oxidizer Grinding Station, was constructed in 1962 and consists of one building and a large, grated concrete-lined sump to contain washwater from station decontamination. It is used primarily for the grinding of ammonium perchlorate to specific sizes required for rocket motor production. Inspections performed in 1982 and 1986 documented releases of ammonium perchlorate dust to the atmosphere which settled on the ground around the building.

The 1985 Weiss Associates report that measured soil gas VOC concentrations did not sample near Station 0501.

Two groundwater concentration maps prepared by ICF in August 1989, displaying TCA and TCE concentrations in the saturated alluvium of the CSD site, showed large chemical plumes approximately 400 feet south of the station. The maximum contour concentration shown for the TCA plume was 100  $\mu\text{g/l}$  and the maximum contour concentration shown for the TCE plume was 1,000  $\mu\text{g/l}$ . Depth to groundwater is five to fifteen feet. A second pair of groundwater concentration maps, also prepared by ICF in August 1989, display TCE and TCA concentrations in the Upper Santa Clara Formation. The TCA map shows a chemical plume approximately 400 feet south of the station with the maximum contour concentration shown as 1,000  $\mu\text{g/l}$ . The TCE map reveals a chemical plume approximately 400 feet south of the station, with the maximum contour concentration shown as 1,000  $\mu\text{g/l}$ .

The containment structure at Station 0501 comprises a concrete trench extending 16 feet across the entire front opening of the lower level of the station (where an ammonium perchlorate transfer cart is situated during facility operations). This trench extends to a concrete-lined sump with dimensions of 13 feet by 12 feet by 5 feet and an estimated capacity of 4,500 gallons.

No liquid reagents are used during grinding operations. The containment units were designed to contain cart washdown water, station decontamination water, and fire suppression water in the event of fire system activation. The sump at Station 0501 has sufficient capacity to contain all cart washdown, station decontamination, and fire suppression water from the station.

The sprinkler system is not known to have been activated (except for testing). Ammonium perchlorate cart washdown has been performed at the station intermittently, but this practice was discontinued with construction of a new ammonium perchlorate cart wash facility at Station 0503. The new facility was put on-line in April 1990.

Station decontamination is performed only once per year or less, when maintenance or other non-station personnel must enter the building to perform equipment repair or related activities. Decontamination of the interior of the building and exterior of the equipment involves washing all surfaces with water from a hose. The facility decontamination water is trapped by the trench, which conducts the water to the sump. Water use at the station is discouraged, however, because ammonium perchlorate is extremely hygroscopic. A small amount of water can contaminate an entire batch of ammonium perchlorate. The contents of the sump are pumped out and disposed offsite after each station decontamination.

### **Chemical Usage**

Ammonium perchlorate is the only chemical handled at Station 0501. Chemical usage was determined based on information from CSD.



## **Investigations at Station 0501**

Soil and soil gas samples were collected at shallow intervals where releases from Station 0501 would be expected to migrate and from deeper intervals to further establish the potential for Station 0501 to be a source of identified groundwater contamination.

The sampling program at Station 0501 consisted of collecting four soil gas samples on September 8, 1989, two surface soil samples on September 7, 1989, and three subsurface soil samples from three borings from October 6, 1989. Figure D-87 presents sampling locations at Station 0501.

**Soil Gas:** Soil gas samples were analyzed for aromatic and halocarbon VOCs. The location and depth of each soil gas sample are presented below:

- SG-01** Located near the northeast corner of the sump and northwest of the main building to investigate possible leaks from the sump. Sampling depth was 4 to 5 feet.
- SG-02** Located near the drainage ditch and west of the main building leading to the sump to investigate possible infiltration from the ditch. Sampling depth was 3 to 4 feet.
- SG-03** Located on a terrace off the southeast corner of the building to determine if VOCs are migrating from the building. Depth of sampling was 6 feet.
- SG-04** Same location as SG-02, but at a depth of 9.5 feet.

**Surface Soil:** Samples were analyzed for VOCs, using EPA Method 8240, and perchlorate. The location, depth, and description of each surface soil sample are presented below:

- SS-01** Located at the southwest corner of the building in an area with a white soil stain. The sampling depth was 6 inches. The sample consisted of a moist, dark brown, clayey silt.
- SS-02** Taken from below the terrace on the south side of the building in an area which may contain outwash from the facility doors. Sampling depth was 8 inches. The sample was a dry, medium brown silty sand.

**Soil Borings:** The location, depth and description of each sample is presented below:

- SB-01-05** Collected southeast of the building 10 feet from the location of SG-03. The sample was collected at a depth of 5 feet. Moist, reddish brown clayey silt with some fine sand and gravel was encountered.
- SB-02-05** Collected near a drainage ditch 10 feet from the SG-02 location. Sampling depth was 5 feet and dark reddish brown clayey silt with some fine sand and some gravel was encountered.
- SB-03-05** Collected off the corner of a sump, 10 feet from location SG-01, at a depth of 5 feet. Dry, reddish brown sandy silt with some gravel was encountered.

Samples SB-01-05, SB-02-05, and SB-03-05 were composited by the laboratory and analyzed for VOCs using EPA Method 8240. These samples were also individually analyzed for perchlorate.

## Analytical Results

Table D-111 summarizes the analytical results for samples collected at Station 0501.

Because the three subsurface soil samples were composited, the actual VOC concentrations should be tripled (assuming that only one sample was the source) to determine a maximum worst case concentration for the three sample involved.

The containment structure for Station 0501, which consists of a concrete trench and collection sump, was re-evaluated. The potential for a previous release of VOCs from this structure is limited.

## Summary

Based on data obtained from these investigations and a review of existing information, Station 0501 does not appear to be a source of VOCs in groundwater. The levels of VOCs detected in soil samples from Station 0501 are below the threshold value. No further investigation at this station is recommended.

Table D-111  
SUMMARY OF SAMPLING EVENTS AT STATION 0501  
Sampling conducted by ICF Technology Incorporated, September and October 1989

Sample ID	Date Collected	Depth (Feet)	Chemical Concentration *			
			Total VOCs (1)	TCE	Toluene	Perchlorate
SG-01	09/08/89	5.0	400	75	320	NA
SG-02	09/08/89	4.0	170	170	ND	NA
SG-03	09/08/89	6.0	63	ND	63	NA
SG-04	09/08/89	9.5	50	50	ND	NA
SS-01	09/07/89	0.5	12	12	ND	610,000
SS-02	09/07/89	0.7	34	28	6	6,200,000
SB-01-05, SB-02-05, and SB-03-05	10/06/89	5.0	75	ND	75	NA
SB-01-05	10/06/89	5.0	NA	NA	NA	14,000
SB-02-05	10/06/89	5.0	NA	NA	NA	190,000
SB-03-05	10/06/89	5.0	NA	NA	NA	45,000

- \* Soil gas concentrations in ppbv; soil sample concentrations in µg/kg.  
(1) Analysis using EPA Method 8240. Those compounds not listed were not detected above laboratory reporting limit.

TCE = Trichloroethene

ND = Not detected above the laboratory reporting limit

ATTACHMENT 2  
GROUNDWATER DATA

DLI  
QA  
**RCRA FACILITY INVESTIGATION/CORRECTIVE MEASURES STUDY**

**ADDENDUM**

**UNITED TECHNOLOGIES CORPORATION**

**CHEMICAL SYSTEMS DIVISION**

Prepared for:

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Project Engineer



June 1993

### **3.3.3 Final WDR Report**

The WDR Provision C.9.a(10) report [ICF, March 1992e] was the last deliverable due to the agencies regarding the characterization and remediation of groundwater in lower Shingle Valley and lower Mixer Valley. This report was also the last deliverable relevant to remedial investigations due to the agencies under WDR Order 89-008. Although this is the last deliverable under the WDR, CSD will continue to routinely monitor the groundwater extraction and treatment systems and provide discussions of these actions in the Environmental Monitoring Program quarterly reports.

### **3.4 Perchlorate Survey**

As part of the WDR Provision C.9.a(12) studies, soil samples were taken at 12 stations at the CSD site and analyzed for perchlorates. These soils data were reported in the RFI/CMS report [ICF, June 1991].

In the second quarter of 1992 the perchlorate soils data was evaluated and a perchlorate sampling and analysis plan for groundwater was prepared. The purpose of the perchlorate sampling and analysis plan was to provide survey information regarding the distribution of perchlorate in groundwater at the CSD site. The proposed locations for perchlorate samples (i.e., wells) were based on the results of the soils sampling. The plan proposed that groundwater samples be obtained and analyzed from six wells and from reuse storage Ponds 2130 and 2140. The wells were sampled in August 1992 and the ponds were sampled in May 1993. The results are reported in Table 3-3.

As a follow-on to the sitewide perchlorate survey, the off-site wells (Wells OS-1 through OS-5) in lower Shingle Valley and Wells EV-21E and EV-40 at the CSD property boundary in lower Shingle Valley were sampled for perchlorates in April 1993. The results of these analyses are also reported in Table 3-3.

**Table 3-3**  
**Summary of Groundwater Perchlorate Analyses at the CSD Site**

Sample Location	Sample Date	Perchlorate Concentration (mg/L)
Well 13R-01	August 4, 1992	ND
Well 20C-34	August 11, 1992	14
Well 20C-35	August 10, 1992	13
Well 20F-11	August 12, 1992	58
Well RAT-04	August 4, 1992	ND
Well RI-06	August 10, 1992	48
Well OS-1	April 14, 1993	ND
Well OS-2	April 14, 1993	ND
Well OS-3	April 14, 1993	0.3
	April 29, 1993	0.1
Well OS-4	April 14, 1993	ND
Well OS-5	April 14, 1993	ND
Well EV-21E	April 29, 1993	0.1
Well EV-40	April 29, 1993	ND
Pond 2130	April 29, 1993	1.0
Pond 2140	April 29, 1993	0.1

ND - Not detected

**Second Quarter 1997**  
**Environmental Monitoring Report**  
(copy 2)

**United Technologies Corporation**  
**Chemical Systems Division**  
**Santa Clara County, California**

**April—June, 1997**

## Section 4.0 Groundwater Monitoring

### 4.1 Groundwater Elevations

Water levels are measured in all wells at CSD on a quarterly basis. Appendix A contains second quarter groundwater elevation data. Groundwater levels were measured from April 1—3, 1997. Groundwater levels are also taken during routine sampling. Appendix C contains sampling information. Water level data are collected contemporaneously so that groundwater elevations are comparable across the entire site for a given set of groundwater conditions. Given that there are 315 active wells, each water level collection event typically takes three to four days. A tabular summary of historical groundwater elevations is presented in Appendix A. Groundwater elevation maps were constructed as required and are presented in Appendix G. The groundwater elevation maps were constructed using the second quarter data set which was taken between April 1-3. Maps were prepared for the major geographic subdivisions of the Coyote facility for both the alluvium and the Santa Clara Formation.

### 4.2 Groundwater Analyses

Wells were sampled in second quarter 1997 according to the schedule designated in the 1997 EMPP (UTC 1996) except where circumstances prevented sample collection. A total of 114 wells were successfully sampled at the Coyote facility this quarter, while nine wells were dry and could not be sampled. Analytical results for all wells sampled this quarter are provided in Appendix B. Field data associated with sampling activities can be found in Appendix C.

#### First Detections & Confirmation Sampling

Table 4-1 shows first time detections which occurred during second quarter 1997. The listed parameter indicates it has been detected for the first time in the history of the corresponding well.

Table 4-1  
Groundwater First Detections

Well Name	Date Sampled	Analysis	Compound	Result
19G-06	4/23/97	8310	anthracene	4.29
19G-06	4/23/97	8310	benzo(a)anthracene	2.30
19G-07	5/22/97	8021	styrene	0.6 µg/L
19G-20	4/23/97	8021	1,2,4-trimethylbenzene	1.2 µg/L
20N-03	5/8/97	8021	Freon 11	0.5 µg/L
29G-03	6/13/97	ISE	perchlorate	0.6 mg/L
BC-03W*	6/18/97	ISE	perchlorate	0.1 mg/L
EV-28*	6/13/97	ISE	perchlorate	0.2 mg/L
EV-45E*	6/13/97	ISE	perchlorate	0.1 mg/L
LMV-03B	6/16/97	ISE	perchlorate	0.2 mg/L

< = not detected at or above reporting limit; N/A = Not Available, \* = first time analyzed



Table 4-1 (continued)

Well Name	Date Sampled	Analysis	Compound	Result
RI-02W*	6/18/97	ISE	perchlorate	0.1 mg/L
RI-09W*	6/18/97	ISE	perchlorate	0.1 mg/L
RI-10W	4/29/97	8021	Freon 11	0.8 µg/L
RI-22W	5/8/97	8021	Freon 11	0.9 µg/L
RI-27W	5/8/97	8021	Freon 11	1.2 µg/L
RI-28W	5/8/97	8021	Freon 11	1.2 µg/L
RI-46W*	6/18/97	ISE	perchlorate	5.2 mg/L
RI-49W*	6/18/97	ISE	perchlorate	6.6 mg/L

< = not detected at or above reporting limit; N/A = Not Available, \* = first time analyzed

Table 4-2 shows confirmation sampling results for first time detections. The results are those currently available, and may include confirmation of initial samplings that occurred during the current quarter or previous quarters. A first detection for well 710-01 which occurred on February 26, 1997 was inadvertently omitted from the first quarter first detections table. These results, along with confirmation sampling results from a sample collected during second quarter are reported in Table 4-2.

**Table 4-2**  
**Groundwater Confirmation Sampling Results**

Well Name	Date Sampled	Analysis	Compound	First Detect Result (µg/L)	Confirmation Result (µg/L)
19G-04	2/25/97	8021	1,2,4-trimethylbenzene	1.7 µg/L	<0.5 µg/L
19G-04	2/25/97	8021	chloroethane	1.7 µg/L	<0.5 µg/L
19G-05	2/27/97	8021	sec-butylbenzene	1.1 µg/L	1.7 µg/L
19G-05	2/27/97	8021	chloromethane	1.1 µg/L	<0.5 µg/L
19G-06	2/27/97	8021	1,2,4-trimethylbenzene	0.5 µg/L	<0.5 µg/L
19G-06	2/27/97	8021	n-butylbenzene	1.8 µg/L	<0.5 µg/L
19G-07	2/6/97	8021	1,2-dichlorobenzene	4.6 µg/L	<0.5 µg/L
19G-07	2/6/97	8021	1,2,3-trichlorobenzene	16.4 µg/L	<0.5 µg/L
19G-07	2/6/97	8021	1,2,4-trichlorobenzene	7.9 µg/L	<0.5 µg/L
19G-07	2/6/97	8021	hexachlorobutadiene	1.6 µg/L	<0.5 µg/L
19G-07	2/6/97	8021	isopropylbenzene	2.1 µg/L	1.9 µg/L
19G-07	2/6/97	8021	n-butylbenzene	3.3 µg/L	2.8 µg/L
19G-07	2/6/97	8021	napthalene	2 µg/L	1.9 µg/L
19G-07	2/6/97	8021	sec-butylbenzene	1.9 µg/L	3.3 µg/L
19G-22	2/25/97	8021	chloroethane	2.8 µg/L	6.4 µg/L
19R-11	1/30/97	8021	TCE	6 µg/L	13 µg/L
20D-08	3/19/97	ISE	CLO4	20 mg/L	11.0 mg/L
20D-18	8/7/96	8081	Aroclor 1242	1.5 µg/L	N/A
20G-11	3/19/97	ISE	CLO4	2.0 mg/L	<0.1 mg/L
20G-12	3/19/97	ISE	CLO4	2.4 mg/L	0.1 mg/L
20H-01	3/19/97	ISE	CLO4	1.2 mg/L	0.1 mg/L
20M-08E	2/14/97	ISE	CLO4	0.3 mg/L	0.3 mg/L

< = not detected at or above reporting limit; N/A = Not Available

**Table 4-2 (continued)**

Well Name	Date Sampled	Analysis	Compound	First Detect Result (µg/L)	Confirmation Result (µg/L)
710-01	4/23/97	8310	anthracene	30.8 µg/L	11.1 µg/L
BC-04W	1/27/97	ISE	CLO4	7.1 mg/L	5.0 mg/L
EV-20	3/19/97	ISE	CLO4	0.6 mg/L	0.2 mg/L
EV-43E	2/10/97	8021	Freon 11	0.5 µg/L	<0.5 µg/L
LMV-01	3/19/97	ISE	CLO4	1.2 mg/L	<0.1 mg/L
OS-01	1/10/97	ISE	CLO4	0.11 mg/L	<0.1 mg/L
RAT-04	2/10/97	8021	Freon 11	109 µg/L	1 µg/L
RI-05W	3/5/97	ISE	CLO4	4.4 mg/L	2.9 mg/L
RI-18W	3/18/97	ISE	CLO4	0.4 mg/L	0.2 mg/L
RI-27W	1/29/97	ISE	CLO4	6.0 mg/L	5.3 mg/L
RI-45W	1/30/97	ISE	CLO4	3.4 mg/L	4.2 mg/L
RI-45W	1/30/97	8021	Freon 11	73.2 µg/L	36.4 µg/L
RI-46W	3/4/97	8021	Freon 11	3.9 µg/L	4 µg/L
RI-47W	3/4/97	ISE	CLO4	9.4 mg/L	7.9 mg/L
RI-48W	3/12/97	ISE	CLO4	12 mg/L	1.5 mg/L

< = not detected at or above reporting limit; N/A = Not Available

### Shingle Valley

Forty-five wells in Shingle Valley were scheduled for sampling this quarter. All scheduled Shingle Valley wells were successfully sampled with the exception of two wells which were dry.

### Station 0710 Area

Ten wells in the vicinity of the Station 0710 diesel plume were analyzed for BTEX compounds by EPA Method 8021. Wells 19G-04, 19G-05, 19G-06, 19G-22, and 710-01 showed detections for benzene consistent with historical data. Wells 19G-07 and 19G-10, which have detected benzene inconsistently in the past, did not detect benzene this quarter. No BTEX compounds were detected in the following wells (19G-03, 19G-07, 19G-07, 19G-10, 19G-20, 19G-21, 19H-01, 710-03, and 710-04).

Wells 19G-04, 19G-05, 19G-06, 19G-07, and 19G-22 detected various EPA Method 8021 compounds for the first time during first quarter. Table 4-2 shows the initial results compared to the re-sampling results. Eight of the eighteen first time detections for the station 0710 area exhibited confirming results.

A first detection for styrene (0.6 µg/L) was noted in a sample collected from well 19G-07 on May 22, 1997. Confirmation sampling results related to this first detection will be available next quarter.

Six wells (19G-03, 19G-06, 19G-20, 19G-21, 710-01, and 710-04) in the vicinity of Station 0710 were sampled and analyzed for TPHd to monitor the Station 0710 diesel plume. All six wells detected TPHd within their respective historical concentration range.

In addition, it should be noted that the TPHd concentrations reported were indicative of aged diesel. Floating product measurements were attempted at sixteen wells in the vicinity of Station 0710. Floating diesel product was detected only in well 19G-07 at 0.04 inches.

Samples from wells 19G-06, 19G-20, and 710-01 were analyzed for PNAs by EPA Method 8310. Well 19G-20 did not detect any PNAs this quarter. Low concentrations of naphthalene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, and chrysene were detected in well 19G-06. All of these compounds have been previously detected in this well except for anthracene and benzo(a)anthracene which were detected for the first time.

A sample and a duplicate were collected from well 19G-20. The sample showed 0.78 µg/L of phenanthrene and no pyrene, while the duplicate showed 1.29 µg/L of pyrene and no phenanthrene when analyzed by EPA Method 8310. Both of these compounds have been detected previously, albeit inconsistently.

The PNA analysis performed on well 710-01 showed low levels of phenanthrene, fluoranthene, pyrene, and chrysene. Anthracene (11.1 µg/L) was detected for the first time at this well.

### **Lower Shingle Valley**

Twenty-one wells were sampled and analyzed from LSV. Two wells (EV-38E and EV-40) were dry and could not be sampled. With the exception of wells EV-43E, all wells that were monitored this quarter were within their historical range. Extraction well EV-43E, located at the property boundary detected Freon 11 (0.5 µg/L) for the first time in first quarter. This well was re-sampled this quarter and did not detect Freon 11. No VOCs were detected at boundary extraction well EV-46E. This well had previously detected low concentrations of TCE from 0.8 µg/L to 1.4 µg/L. Well EV-29 on the outside of the eastern edge of the VOC plume remains clean.

Groundwater from five LSV wells was analyzed for perchlorate ion (Table 4-3). Wells 29G-03, EV-28, EV-45E, and EV-46E were sampled for the first time for perchlorate. Well 29G-03 showed a first time detection (<0.1 mg/L) compared to analysis of an initial sample collected in June 1994 which did not detect perchlorate. Wells EV-28 and EV-45E displayed first time detections by virtue of the fact that they were sampled for perchlorate for the first time. Confirmation sampling results for these wells will be available next quarter.

**Table 4-3  
LSV Perchlorate Sample Results**

Well Name	Date Sampled	Analysis	Result (mg/L)
29G-03	6/13/97	ISE	0.6
EV-20	6/3/97	ISE	0.2
EV-21E	4/10/97	ISE	0.15
EV-21E	6/13/97	ISE	0.1
EV-28	6/13/97	ISE	0.2
EV-45E	6/13/97	ISE	0.1
EV-46E	6/13/97	ISE	<0.1

< = not detected at or above reporting limit; N/A = Not Available

### Offsite Monitoring

Offsite well OS-01 was sampled for VOC analysis on a monthly basis. The other four off-site wells (OS-02, OS-03, OS-04, and OS-05) were sampled quarterly. No VOCs were detected in the offsite wells this quarter.

Perchlorate was detected in well OS-01 (0.11 µg/L) for the first time in January of this year. This well was sampled once previously in April 1993 (<0.1 mg/L). Perchlorate was not detected this quarter.

### Mixer Valley

Twenty-three MIX wells were sampled this quarter. Well 17N-06B was not sampled because it was dry, nor was well 20D-18 because it is being replumbed to the new 0535 GTS. Data associated with the monitoring of the MIX VOC plume was within historical ranges. Uncontaminated wells 20G-14, 20G-17, and 20G-22 that monitor the leading edge of the VOC plume did not detect VOCs.

Three wells near the Station 0535 PCB remediation site were analyzed for PCBs by EPA Method 8081. Wells 20D-21 and 20D-09 are located downgradient of the Station 0535 PCB remediation site, and well 20D-10 is located transgradient. None of the three wells detected PCBs. Well 20D-18 will be sampled and analyzed when the well is back online to confirm the first detect encountered in August 1996.

Nine wells were sampled and analyzed for perchlorate ion by ISE, as shown in Table 4-4. Wells 20G-11, 20G-12, 20H-01, and LMV-01 were sampled to confirm first time detections. Wells 20G-11, 20H-01, and LMV-01 did not confirm the presence of perchlorate ion in groundwater. The re-sampling of well 20G-12 confirmed the presence of perchlorate. Both alluvium wells LMV-01 and LMV-02, as well as Santa Clara well LMV-03B are located near the confluence of Mixer Creek and Las Animas Creek. These wells monitor groundwater in the vicinity of the property boundary. Perchlorate was detected for the first time in Well LMV-03B at 0.2 mg/L. Results from the resampling of well LMV-03B will be available in third quarter. Wells 20H-03, 20H-04 and LMV-02, which were sampled for the first time, did not detect perchlorate.

**Table 4-4  
Mixer Valley Perchlorate Sampling Results**

Well Name	Date Sampled	Analysis	Result (mg/L)
20D-08	6/5/97	ISE	11.0
20F-11	4/22/97	ISE	32
20G-11	6/3/97	ISE	<0.1
20G-12	6/13/97	ISE	0.1
20H-01	6/3/97	ISE	0.1
20H-02	4/10/97	ISE	0.77
LMV-01	6/3/97	ISE	<0.1
LMV-02	6/16/97	ISE	<0.1
LMV-03B	6/16/97	ISE	0.2

< = not detected at or above reporting limit; N/A = Not Available

### **Panhandle Area**

Twenty-one PAN wells were scheduled for sampling during second quarter. Six wells (BC-05W, BC-06W, RI-01W, RI-36W, RI-41W, and RI-42W) were dry and could not be sampled.

First detection confirmation of Freon 11 was recorded at two wells in the PAN area this quarter. Well RI-45W monitors the northwestern edge of the VOC plume. The Freon 11 (73.2 µg/L) first detected in first quarter was confirmed this quarter (36.4 µg/L). Well RI-46W monitors the northern edge of the VOC plume. The Freon 11 (3.9 µg/L) first detected in first quarter was confirmed this quarter (4 µg/L).

Four wells in the PAN area displayed first time detections for Freon 11. Wells RI-10W, RI-22W, RI-27W, and RI-28W exhibited very low level concentrations of Freon 11 ranging from 0.8 to 1.2 µg/L. Results of confirmation samples for these four wells will be available next quarter.

Well RI-11 confirmed the presence of TCE, which was first detected during first quarter.

Several other plume boundary monitoring wells were sampled this quarter including: BC-04W (eastern edge), RI-15W (north edge), RI-25W (eastern edge), RI-43W (southeast edge), RI-47W (western edge), RI-48W (northeastern edge), and RI-49W (eastern edge). These wells remain clean for VOCs, indicating that the VOC plume boundary remains relatively unchanged near these areas.

Fourteen PAN area wells were sampled for perchlorate this quarter. Table 4-5 shows the history of perchlorate sampling for the wells sampled this quarter in the PAN area. Five wells (BC-03W, RI-02W, RI-09W, RI-46W, and RI-49W) displayed first time detections for perchlorate by virtue of the fact that they were sampled for perchlorate for the first time. Results of confirmation sampling for these wells will be available next quarter.

**Table 4-5  
PAN Perchlorate Sample Results**

Well Name	Date Sampled	Analysis	Result (mg/L)
BC-02W	6/18/97	ISE	<0.1
BC-03W	6/18/97	ISE	0.1
BC-04W	1/27/97	ISE	7.1
BC-04W	6/5/97	ISE	5.0
RI-02W	6/18/97	ISE	0.1
RI-05W	2/25/94	ISE	<0.1
RI-05W	3/5/97	ISE	4.4
RI-05W	6/6/97	ISE	2.9
RI-06W	8/10/92	ISE	48
RI-06W	4/22/96	ISE	18.
RI-06W	1/20/97	ISE	3.1
RI-06W	1/20/97	ISE	15
RI-09W	6/18/97	ISE	0.1
RI-18W	3/18/97	ISE	0.4
RI-18W	6/4/97	ISE	0.2
RI-19W	3/2/95	ISE	1.6
RI-19W	3/18/97	ISE	3.0
RI-27W	1/29/97	ISE	6.0
RI-27W	6/6/97	ISE	5.3
RI-44W	6/18/97	ISE	<0.1
RI-45W	1/30/97	ISE	3.4
RI-45W	6/4/97	ISE	4.2
RI-46W	6/18/97	ISE	5.2
RI-47W	3/4/97	ISE	9.4
RI-47W	6/4/97	ISE	7.9
RI-48W	3/12/97	ISE	12
RI-48W	6/5/97	ISE	1.5
RI-49W	6/18/97	ISE	6.6

< = not detected at or above reporting limit; N/A = Not Available

### **Motor Test Area**

Eight MTA wells were scheduled and successfully sampled this quarter. Sampling results for wells 19E-01, MTA-01, MTA-02, MTA-04, MTA-07, MTA-08, MTA-09, and MTA-10 were within their historical limits for VOCs.

### **Motor Assembly and Component Test Area**

Seventeen MAA/CTA wells were scheduled and successfully sampled this quarter.

Five new wells in the MAA were sampled for the first time last quarter. Wells 19R-11 and 19R-12 monitor groundwater in the vicinity of Station 1860, while wells 19R-13, 19R-14, and 19R-15 are in the vicinity of Station 1864. Table 4-6 provides a summary of the sampling results for chemicals of concern.

# ROUTING AND TRANSMITTAL SLIP

Date

9/16/97

TO: (Name, office symbol, room number, building, Agency/Post)

Initials

Date

1. Kevin Mayer (SFD-7-3)

2.

3.

4. Re: Perchlorate

5.

Action	File	Note and Return
Approval	For Clearance	Per Conversation
As Requested	For Correction	Prepare Reply
Circulate	<input checked="" type="checkbox"/> For Your Information	See Me
Comment	Investigate	Signature
Coordination	Justify	

## REMARKS

THANKS.

Kevin,

Attached FYI is a summary of what we now know regarding perchlorate at the UTC site in San Jose, CA. If you have any questions, please contact Ron Reach (744-2031) or myself. Thanks,

Harry

P.S. We expect to have similar summaries later this week for Rocketdyne SSFL and Whittaker-Bermite. We are also continuing to investigate perchlorate in Nevada.

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post)

Room No.—Bldg.

Harry Bowerman  
WST-5

Phone No.

744-2051

5041-102

☆ U.S.G.P.O.: 1993 300-891/80018

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FPMR (41 CFR) 101-11.206